



## An analysis of the meteorological variables leading to apparent temperature in Australia: Present climate, trends, and global warming simulations

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### Abstract:

This study is a comprehensive analysis of thermal comfort and apparent temperature around Australia. It includes a long-term historical trend analysis using observational weather station data, in which it was found that eight out of the ten chosen urban locations experienced warming trends in temperature and/or the apparent temperature over the second half of the twentieth century. Annual trends in temperature and apparent temperature were studied spatially across Australia using high resolution ERA Interim reanalysis data over the period 1979 to 2010. The reanalysis revealed that generally the apparent temperature is warming faster than the air temperature, amplifying the expected exposure to discomfort due to global warming in the subtropical region. Future apparent temperature trends were explored using high resolution Coupled Model Intercomparison Project 3 model data to assess the impacts of global warming on human comfort. A best practice model for the Australian climate was used as well as best case and worst case scenario models selected using the Commonwealth Scientific and Industrial Research Organisation Representative Climate Futures framework. It was found that at 2070 using the AIR emissions scenario the temperature is projected to warm faster than the apparent temperature by up to 1 degrees C in central Australia, suggesting that the cooling power of the wind can partially offset the impacts of global warming. This occurs in conjunction with the accelerated drying predicted to occur in many areas of Australia in future climates. Finally, the impact of the El Nino Southern Oscillation and the Southern Annular Mode on the spatial characteristics of the temperature and apparent temperature around Australia was studied. This revealed that the inherent atmospheric humidity variability of these large-scale processes resulted in milder thermal comfort conditions across Australia regardless of whether the temperature was anomalously warm or cool. Using an apparent temperature framework, this study looks into many facets of the Australian climate uncovering knowledge that is useful for risk assessments as well as future urban planning.

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### Resource Description

#### Climate Scenario :

specification of climate scenario (set of assumptions about future states related to climate)

Other Climate Scenario

**Other Climate Scenario:** MIROC-M; CGM3.1

#### Communication:

# Climate Change and Human Health Literature Portal

resource focus on research or methods on how to communicate or frame issues on climate change;  
surveys of attitudes, knowledge, beliefs about climate change

A focus of content

**Other Communication Audience:** Public safety; planning and health

**Exposure :** ☒

weather or climate related pathway by which climate change affects health

Meteorological Factors, Meteorological Factors, Precipitation, Temperature, Other Exposure

**Temperature:** Fluctuations

**Other Exposure:** apparent temperature

**Geographic Feature:** ☒

resource focuses on specific type of geography

Urban

**Geographic Location:** ☒

resource focuses on specific location

Non-United States

**Non-United States:** Australasia

**Health Impact:** ☒

specification of health effect or disease related to climate change exposure

Injury, Other Health Impact

**Other Health Impact:** Thermal comfort

**Model/Methodology:** ☒

type of model used or methodology development is a focus of resource

Outcome Change Prediction

**Resource Type:** ☒

format or standard characteristic of resource

Research Article

**Timescale:** ☒

time period studied

Long-Term (>50 years)